Tutorial 2: Public Library Computer Work Station Usage

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With the increased relevance of computing technology in our society, municipal public libraries have become spaces that work to facilitate community building through open access to computing technologies such as desktop computers, laptops, and the internet. The City of Toronto is home to one hundred public library branches, each of which offers free use of computer workstations for community members. In this tutorial, I analysed the Toronto Public Library's desktop workstation usage data collected between 2018 and 2022 to determine how many sessions have taken place each year, per branch, on average.

I began planning by making a sketch of the required data that would be needed and a visual representation of the graph that would be produced after analyzing the data (see Figure 1). I then simulated the required data set by randomly assigning a usage count with each for the one hundred branches for the 5 years of collected data by following the simulation examples in Telling Stories with Data (Alexander 2023). After this, I gathered the Library Workstation Usage data set from Open Data Toronto using the opendatatoronto package (Gelfand 2022).

The next step was processing and cleaning the data set by using the statistical programming language R (R Core Team 2023). I did this with the help of the examples from Chapter Two in Telling Stories with Data as a guide (Alexander 2023). Throughout this process, I also used the R language packages, knitr (Xie 2023), dplyr (Wickham, François, et al. 2023), tidyverse (Wickham et al. 2019), and janitor (Firke 2023) to help clean and display the data. I also used gitcreds (Csárdi 2022) and usethis(Wickham, Bryan, et al. 2023) to facilitate version control. Following the cleaning of my data, I built a graph to represent the average number of workstation sessions that took place at each branch over the given five years (see Figure 2).

I found that 2018 had the highest recorded computer work space usage with an average of 42,814 sessions per branch. Usage numbers in 2019 dropped slightly to an average of 39,875. The recorded usage in 2020 dropped significantly to an average of 10,208 sessions. The lowest

usage was in 2021 with an average of 4790 sessions per branch. Numbers recovered moderately in 2022 with 14,841 sessions per branch.

The Toronto Public Library's computer work space usage dropped marginally between 2018 and 2019 but a further analysis of trends may conclude this is a normal variation. The drop in usage from 2019 to 2020 however may be reflective of COVID-19 public safety measures which caused many public spaces in Canada to restrict public access. This continued through 2021 where the data shows the lowest usage of public computers at the libraries. However, a recovery is evident in the 2022 numbers, possibly reflecting an easing of public safety measures. An analysis of the 2023 data, when made available, could give insight into how public usage has changed compared to pre-pandemic levels as most of Canada's pandemic related restrictions have been lifted.
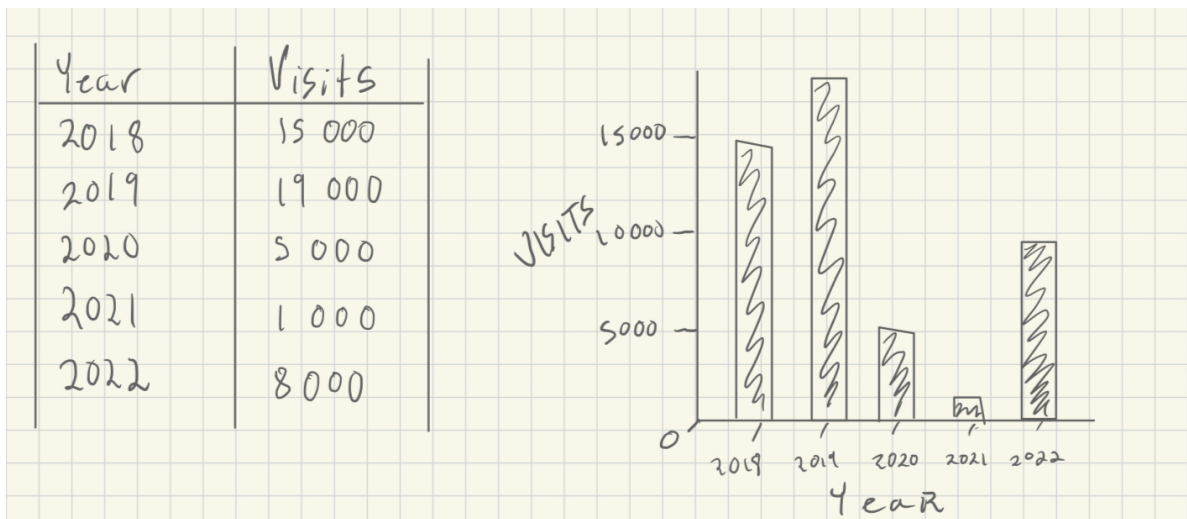
Appendix

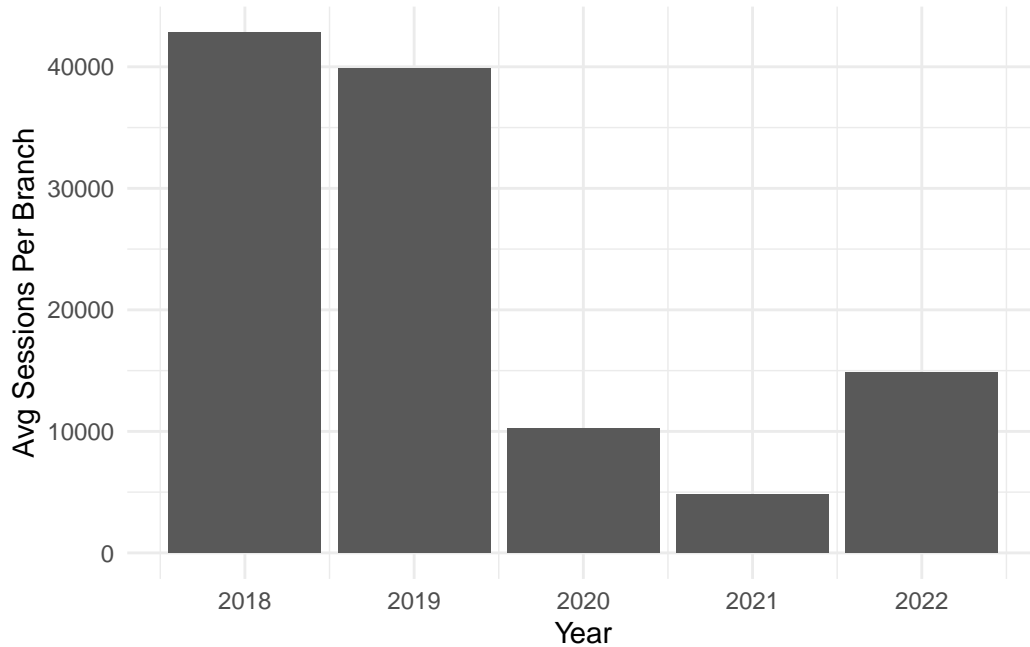Figure 1: Planning sketch for data-set and visual output (graph)

Figure 2: Average number of yearly Toronto Public Library computer work station sessions per branch, based on data from 2018 - 2022 obtained from Open Data Toronto.

References

Alexander, Rohan. 2023. *Telling Stories with Data.* Chapman; Hall/CRC. https://tellingstorieswithdata.com.

Csárdi, Gábor. 2022. *Gitcreds: Query 'Git' Credentials from 'r'.* https://CRAN.R-project.org/package=gitcreds.

Firke, Sam. 2023. *Janitor: Simple Tools for Examining and Cleaning Dirty Data.* https://CRAN.R-project.org/package=janitor.

Gelfand, Sharla. 2022. *Opendatatoronto: Access the City of Toronto Open Data Portal.* https://CRAN.R-project.org/package=opendatatoronto.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing.* Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.

Wickham, Hadley, Jennifer Bryan, Malcolm Barrett, and Andy Teucher. 2023. *Usethis: Automate Package and Project Setup.* https://CRAN.R-project.org/package=usethis.

Wickham, Hadley, Romain François, Lionel Henry, Kirill Müller, and Davis Vaughan. 2023. *Dplyr: A Grammar of Data Manipulation.* https://CRAN.R-project.org/package=dplyr.

Xie, Yihui. 2023. *Knitr: A General-Purpose Package for Dynamic Report Generation in r.* https://yihui.org/knitr/.